AERATING APPARATUS UTILIZING ROTATING IMPELLER VANE

The improved aerating apparatus comprising the present invention has been designed for use primarily in connection with the treatment of natural outdoor bodies or ponds of stagnant water such as are frequently found in farming communities, and in the vicinity of which cattle, sheep and the like are allowed to graze. Due to the infiltration of animal waste, such ponds frequently become polluted and thus present an obnoxious odor to the adjacent countryside.

In an effort to alleviate such a situation, it has been the practice in some instances to treat the pond with deodorizing or neutralizing chemicals. However, such a remedy is employed only when the extent of pollution is slight and can be neutralized with the use of extremely mild chemicals in small quantity so as to avoid the danger of rendering the water poisonous for livestock. Furthermore, the uniform distribution of chemicals throughout the entire pond presents a problem, particularly if the pond is large. Still further, this practice requires the frequent testing of the water content and a knowledge of the chemistry involved. In other instances, it has been the practice to install expensive underground equipment for aerating the pond, including the use of underground pipes, compressors, aerating nozzles and pumping facilities of a permanent nature for supplying air to the pond through such pipes and nozzles.

The present invention is designed to overcome the above-noted limitations that are attendant upon the treatment of stagnant and polluted bodies of water and, toward this end, the invention contemplates the provision of a relatively portable aerating apparatus which may conveniently be mounted adjacent the shoreline of the pond and set into operation for a period of time until the pollution has been remedied, after which it may be removed and transported to storage without major disassembly problems.

More specifically, the invention embodies a motor driven rotatable cylindrical hollow casing intended to be submerged below surface of the pond. The casing is provided with one or more helical vanes at its outer end. There are a series of holes or openings in the casing wall adjacent the helical vanes. The hollow casing is driven by a hollow drive shaft connected to a motor. The upper end of the drive shaft contains air inlet holes or openings for sucking in air from above the pond surface. When the vanes rotate they throw water outwardly and axially and this creates a region of low or sub-atmospheric pressure in the vicinity of the holes. This draws air from the interior of the casing and pushes air into the surrounding water.

Among the important features of the present invention are the particular nature of the helical vanes, their positional relationship with respect to the air outlet holes, and the method by means of which they are fashioned and installed on the pump casing. Insofar as such method is concerned, a full description thereof will be made subsequently when the nature of the helical vanes is better understood, it being deemed sufficient for the present to state that by the use of such method, the vanes may be constructed and mounted on the pump casing simultaneously and with comparative facility.

The provision of an aerating apparatus such as has briefly been outlined above, and possessing the stated advantages, and the provision of the yet-to-be-described method constitute the principal objects of the present invention. Other objects and advantages, not at this time enumerated, will become readily apparent as the following description ensues.

In the accompanying single sheet of drawings forming a part of this specification, one illustrative embodiment of the invention has been shown.

In these drawings:

FIG. **1** is a fragmentary perspective view of an outdoor pool or body of stagnant water, showing the improved aerating apparatus operatively mounted in relation thereto;

FIG. **2** is an enlarged fragmentary side elevational view of a limited portion of a rotary aerator pump unit employed in connection with the present invention with one of the pump vanes broken away in the interests of clarity;

FIG. **3** is an enlarged right hand end view of the pump unit shown in FIG. **1** with the end support therefor omitted in the interests of clarity;

FIG. **4** is an enlarged side elevational view of the distal or right hand end portion of the aerator pump unit;

FIG. **5** is a greatly reduced side view of a sheet metal-coned split ring or Belleville washer which constitutes a blank from which the helical water-impelling vanes that are employed in connection with the present invention are fashioned;

FIG. **6** is a front elevational view of the blank of FIG. **5** showing the vane during its progressive stage of fashioning; and

FIG. **7** is a side elevational view of the fully fashioned vane in its free state.

Referring now to the drawings in detail, and in particular to FIG. **1**, an aerating apparatus constructed according to the present invention is designated in its entirety by the reference numeral **10**, and it is shown as being land-mounted adjacent to and in operative association with an outdoor body or pond **12** of stagnant water which it is desired to aerate and thus oxidize or otherwise de-vegitate or oxidize the pollutants associated therewith and render the same less noxious.

The apparatus involves in its general organization an elongated assembly including an aerator pump proper **16** and a tubular air inlet extension **18** which also constitutes a drive tube for the pump proper, an electric motor M for driving the assembly, a support **20** for the motor M, and an optional outrigger support **22** for the distal or outer end of the assembly.

The assembly is in the form of an elongated hollow cylindrical tubular body, one end of which is provided with an enlarged diameter portion **54** (FIGS. **1** and **4**) which constitutes the pump proper **16** and the remainder of which constitutes the air inlet extension drive **18**. The nature of the assembly will be described in detail presently but, for the present, it is deemed sufficient to state that when the pump proper **16** is submerged in a body of water with the extension **18** projecting above the water level so that its proximate end lies outside the body of water, rotation of the assembly about its longitudinal axis will effect the desired aeration of the body of water. Such aeration is accomplished by providing a series of air outlet openings or holes **24** in the cylindrical wall of the pump casing and providing a means whereby, upon rotation of the unit, a region or zone of sub-atmospheric pressure will be created. The holes are positioned in that region. The interior of the pump cas-